APPENDIX 1

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This form is to be used for collecting information on fiber optic cable damage. Please use one form for every in-service failure event and fill it out as completely as possible. A failure event is defined as an event causing the system to fail to conform to specifications and requirements, or an event which necessitates a repair or replacement in the immediate to near future. Return the form promptly to the address on the last page. We greatly value your cooperation in this important effort to obtain failure data on fiber optic cable damage.

Section 1: FAILURE INFORMATION

1.1 Failure date (mo./day/yr.): .....Time of Day: .....

• Service restoration date (mo./day/yr.): .....Time of day of restoration: .....

1.2 Failure location (city): ..... State: .....

• In what portion of the network did the failure occur?
☐ interoffice ☐ loop ☐ elsewhere (please explain): .....

• What was the installation of the cable at the point of failure (check all that apply) ?
☐ public right of way ☐ private right of way
☐ aerial ☐ buried (depth.....ft) ☐ underground (depth.....ft) ☐ submarine
☐ intrabuilding ☐ other (specify): .....
• For cables installed in close proximity to other sub-surface structures such as gas pipelines and power conduits, name the nearest structure and its distance from the failed cable at the point of failure. .....

1.3 Type of damage (check all that apply):

☐ cable or fiber break ☐ high loss but no break
☐ sheath damage ☐ other (specify): .....

• If the fault was a cable or fiber break, how many fibers broke? .....

1.4 Probable cause:

Note: A dig-up is defined as damage to a cable as a result of an attempt to penetrate the ground. A dig-up resulting from a procedural error such as poor cable locating, is still to be classified as a dig-up.

☐ dig-up ☐ sabotage ☐ firearm ☐ vehicle
☐ lightning ☐ rodent damage ☐ water ☐ ice ☐ temperature extremes
☐ wind ☐ vibration ☐ fire ☐ flood
☐ craft, installation, or procedural error excluding dig-ups (please specify): .....
.....

☐ other (specify): .....
☐ I don't know

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1.5 For failures caused by dig-up, please answer the following:

• Was Telco or other agency (e.g., "One Call" center) notified before contractor started digging? ☐ yes ☐ no ☐ I don't know

-if yes, was the cable route located? ☐ yes ☐ no
-if yes, who located the cable? ☐ telco ☐ locating company (specify:).....
-was the cable located accurately? ☐ yes ☐ no
-with what was the cable route marked? .....
-was the cable route marked accurately and properly? ☐ yes ☐ no
-if not, please specify .....
-was a cable location representative on-site at the time of dig-up? ☐ yes ☐ no

• Was excavation conducted with hand tools around the tolerance zone? ☐ yes ☐ no

• Was the cable route identified with permanent markings? ☐ yes ☐ no
-if yes, how was it marked? ☐ below ground tape ☐ above ground signpost
☐ other (specify:) .....

• Who dug-up the cable (example: telco employee, telco contractor, CATV crew, landowner)?
.....

• Was the cable in an innerduct? ☐ yes ☐ no
-if yes, what type of innerduct? ☐ innerduct in rigid conduit ☐ direct bury type
☐ other (specify:) .....

1.6 Cable Information:

• What was the total number of fibers in the cable? .....

• Was the cable an all-dielectric cable?
☐ yes ☐ no

• Was Cable Armored?
☐ yes ☐ no

1.7 Please include any additional notes or comments that would be helpful in analyzing the failure: .....
.....

Section 2: REPAIR INFORMATION

2.1 Number of Fibers Repaired: .....

2.2 Service Restoration Time (in hours): .....

2.3 Complete Facility Repair time (in hours): .....

2.4 Cost of Completed Repair: .....

2.5 Was anyone billed for damaging the cable? ☐ yes ☐ no

2.6 Please report any unusual problems encountered during repair: .....
.....
.....

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Section 3: COMPLETION INFORMATION

This form has been completed by:

Name: .....

Company: .....

Address: .....

Tel. #: ..... Date: .....

The completed form(s) should be returned to the following address.
More forms can also be obtained from the following address:

John Healy
Bellcore
331 Newman Springs Road, Rm. 2X-227
Red Bank, New Jersey 07701-7020

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APPENDIX 2

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Request for Data on the
Deployed Population of Fiber Optic Cable

This form is for obtaining data on the current population of deployed fiber optic cable. Therefore the most recent figures (such as totals as of the end-of-year 1991) available should be provided. This form only needs to be filled out once for every responding organization. Please provide the owned fiber mileage, sheath mileage, and route mileage deployed for each of the following fiber optic cable installations and attributes:

Deployed Fiber Optic Cable: Installation and Attributes	Fiber Miles	Sheath Miles	Route Miles
Aerial Cable			
Buried Cable			
Underground Cable			
Submarine Cable			
Intrabuilding Cable			
Installed in Private Right of Way			
Installed in Public Right of Way			
Innerduct In Use			
Innerduct in Rigid Conduit			
Direct Bury Innerduct			
Cable Installation Permanently Marked			
Marked with Below Ground Tape			
Marked with Above Ground Sign			
Cable Attributes			
Armored Cable			
Non-armored Cable			
All-dielectric Cable			

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APPENDIX 3

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Existing Practices

Paul E. Devaney
Consultant
Applied Concepts Inc.
353 Lexington Avenue, New York, NY
(908)-722-7228

This Appendix highlights existing fiber optic cable damage prevention standards and procedures. It also provides an activities overview of many national associations, standards and other committees striving to reduce the frequency and severity of cable damage and its impact on telecommunications network reliability.

National Standards

American National Standards Institute, ANSI/EIA/TIA-590

Standard for Physical Location and Protection of Below-Ground Fiber Cable Plant

This standard was developed under cognizance of the Telecommunications Industry Association (TIA) and its Fiber Optic Engineering Subcommittee on Fiber Optic Cable Plant Installation (TIA FO-2.5).

The subcommittee includes members representing a cross-section of facility owners, contractors, suppliers, and representatives of the U.S. Army and U.S. Navy. The standard is endorsed by the Associated General Contractors, National Utility Contractors Association, United States Telephone Association, Rural Electrification Administration, Bellcore, AT&T, US Sprint, and several other organizations having mutual interests.

The standard specifies the minimum depth at which fiber optic cables should be buried and the distance by which they must be separated from other underground facilities. It covers other protective measures that should be observed to reduce the probability of damage resulting from excavation or similar work operations in the vicinity of such cables. The standard also defines responsibilities, recommends procedures, and outlines damage prevention measures for excavators and facility owners to observe.

An important paragraph found in section 13 of this standard states that both parties, i.e., excavators and facility owners, bear responsibility for the successful operation of the "call-before-you-dig" damage prevention program. This requires that each underground facility owner belong to a one-call bureau(s) which covers their operating area(s), and that excavators should contact one-call bureaus before they start their excavation or similar work.

The standard also covers fiber optic cables buried directly, placed in short sections of underground conduit, or under non-navigable waterways.

In addition to specifying placement depths, this standard also recommends that warning tape be buried 12 in. above a cable and/or permanent visible markers be placed above the cable route, at ground level, and at 1000 ft. intervals.

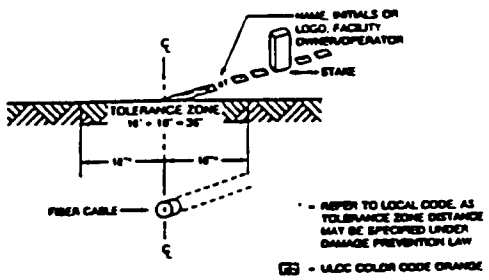
The tolerance zone, often broadly interpreted, is defined as: "That zone where excavation is to be performed with hand tools until the facility is exposed, or maximum depth of the intended excavation is reached." Damage prevention laws usually specify the location of this zone, if no specification exists then 18 in. on each side of the facility center line is the tolerance zone.

The figure below indicates tolerance zone information and the appropriate marking procedures associated with it.

Copies of this standard are available, ordering information is found at the end of this Appendix.

Fiber Cable Marking And Tolerance Zone

For Facility Less Than Two Inches Wide



National Standards

American National Standard C2-1993

1993 National Electrical Safety Code
(Published by the IEEE)

Section 31. General Requirements Applying to Underground Lines

311. Installation and Maintenance

A. Persons responsible for underground facilities shall be able to indicate the location of their facilities.

B. Reasonable advance notice should be given to owners or operators of their proximate facilities that may be adversely affected by new construction or modifications to existing structures and/or utilities.

New Rule for 1993

From time to time, communications and supply companies have expressed the need for uniform and positive identification of buried cable facilities. This need has become even more critical since the 1990 Code permitted the burial of fully insulated cable in random separation with communications facilities. Much of the bare concentric neutral cable used will probably be replaced with jacketed cable in an attempt to mitigate corrosion. While this will correct a serious problem, the absence of the exposed conductors would have hindered positive identification of cables. The following change was approved and the rule shall become effective for cable installed on or after January 1, 1994.

Section 35. Direct-Buried Cable

350. General

G. All direct-buried jacketed supply cable meeting Rule 350B (over 600 Volts to ground) and all direct-buried communication cables shall be legibly marked as follows:

The appropriate identification symbol shown in Fig. 350-1 (below) shall be indented or embossed in the outermost cable jacket at a spacing of not more than 40 in. (1 m.). The symbol may be sequentially combined with other data and/or symbols printed on the jacket, but shall be separated as indicated in Fig. 350-1.

Copies of this standard are available, ordering information is found at the end of this Appendix.

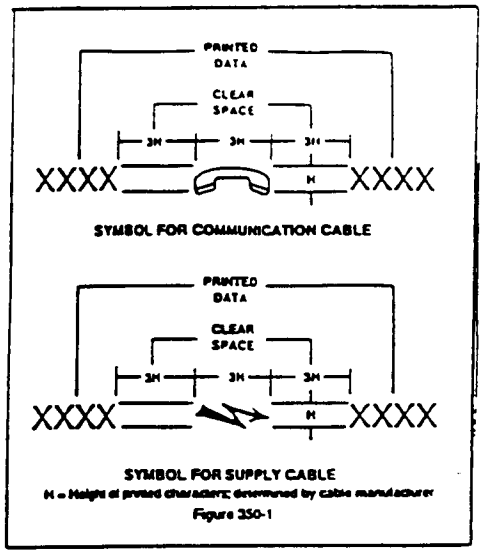


Figure 350-1

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National Communications System (NCS) Technology and Standards

Executive Order 12472, "Assignment of NSEP Telecommunications Functions," established the NCS. The order also directed the NCS to ensure that a national telecommunications infrastructure be developed incorporating the necessary degree of hardness, reliability, inter-operability, and restorability to ensure the survival of national security and emergency preparedness telecommunications in all circumstances, including natural disaster, national crisis or emergency.

In pursuit of this goal the President's National Security Telecommunications Advisory Committee (NSTAC), a group of 30 corporate CEOs charged with advising U.S. Presidents on matters of telecommunications security, formed the Electromagnetic Pulse (EMP) Task Force to develop recommendations for protection of the nation's telecommunications networks.

The EMP Task Force recommended that baseline standards for Electromagnetic Compatibility (EMC) be developed. These standards would provide a measure of EMP protection and at no cost to the government. They would also provide a uniform level of protection for normal threats such as lightning and commercial power faults to telecommunications networks, and establish a baseline level of protection above which the government would compensate for the increased protection provided for above-baseline threats. To date, two of these baseline standards have been completed and issued by the American National Standards Institute, an additional one has been submitted for approval.

Another project having similar goals was requested by the government for development of baseline standards to protect telecommunications links from physical stress and/or damage. This proposed baseline standard will address threats such as flooding, wind, ice, rodents, and corrosion. A draft document of this baseline standard is scheduled for development during 1993.

The One-Call Notification System

By definition, a one-call notification system is a communications capability established by two or more utilities, government agencies, or other operators/owners of underground facilities. This system typically provides a single telephone number to reach a one-call center. It is intended for use by excavators and the general public to notify utilities of their intent to use equipment for excavating, tunneling, demolition, any other similar activities, or otherwise disturbing the sub-surface of the earth. This system provides participating center members (facility owners) an opportunity to identify, locate and protect their underground facilities in the vicinity of proposed excavations.

There is a wide variety of one-call center operational possibilities. They include a simple answering service arrangement, an in-house system run by a participating member, or an incorporated organization of member firms which either awards the operation of a one-call center to a contractor or directly operates/manages the one-call system itself.

The notification system also allows the owners of underground facilities to provide contractors with any necessary information about those facilities and to post a construction watch if appropriate.

To serve the utility companies productively, one-call systems seek to achieve the following goals:

- Prevention of sub-surface facility damage to decrease customer service outages and reduce costs associated with repair and service restoration.

- Protection from loss of, or damage to life, property, or equipment.

- Reduction of excavator downtime.

- Protection of the environment and natural resources.

- Establishment of a watch over unauthorized excavation.

- Assistance for excavators in complying with Occupational Safety and Health Administration (OSHA) regulations, and other federal and state laws and regulations.

- Promoting coordination among utilities, governmental agencies, and other owners and operators of underground facilities for placement and preservation of below ground facilities.

The concept has progressed to where one-call service is now available in all but three states (Hawaii, North Dakota, South Dakota). There are 89 one-call centers operating in the U.S. and often a single center provides coverage for an entire state.

The total number of notifications received by one-call systems in the U.S. was over 30 million for the year 1992. This generated approximately 210 million location requests to utilities and other one-call center members.

Regulations Requiring Utility Notification

State Damage Prevention Laws

Approximately 44 states and the District of Columbia have damage prevention laws to protect underground facilities from damage caused by excavation activities. Although state damage prevention laws are not uniform, they typically require persons engaging in defined excavation activities to provide operators of specified underground facilities advance notice, with relevant details, of their intended excavation. One definition of excavation activity is:

"an operation for the purpose of the movement or removal or earth, rock, or other materials in or on the ground by use of mechanized equipment or blasting, and including auguring, backfilling, drilling, grading, plowing in, pulling in, dredging, tunnelling, and plowing for agricultural purposes in excess of 18 inches in depth."

Fines for violating provisions of these damage prevention laws range from $500. to $50,000. depending on each state's penalty apportionment.

State Highway Notification Requirements

State highway agencies have notification requirements for entities planning to work in public rights-of-way. The notification requirements are usually identified in each state's utilities manual, and are typically part of the permit granting process. Procedures for issuing permits usually require that upon approval of the permit application, advance notice is necessary before beginning work in a right-of-way. A recent IRWA survey found that more than one half of the state highway agencies require notification of a one-call system as part of the permit granting process.

Department of Labor - Occupational Safety and Health Administration (OSHA)

29 Code of Federal Regulations part 1926.651

(b) Underground installations.

1) The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation.

2) Utility companies or owners shall be contacted within established or customary local response times, advised of the proposed work, and asked to establish the location of the underground utility installations prior to the start of actual excavation. When utility companies or owners cannot respond to a request to locate within 24 hours (unless a longer period is required by state or local law), or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used.

3) When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.

4) While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees.

Organizations Involved With Damage Prevention

American Public Works Association (APWA)

The APWA began its work in 1894. This non-profit public service organization has a membership of more than 26,000 engineers, administrators, contractors, utility officials, educators, and others directly or indirectly involved in providing public works facilities and services. APWA headquarters was recently relocated to Kansas City, MO, a branch office is also located in Washington, D.C.

Individual members have an opportunity to participate in one of 64 state, county, and local chapters. The APWA Reporter, published monthly, contains information concerning utility and other public works issues.

Each year the APWA sponsors the "International Public Works Congress and Exposition," the largest annual event of its kind. More than 10,000 members and guests participate in approximately 120 technical program sessions along with 400 exhibits featuring various types of equipment and services. Many programs are presented at this annual conference including utility issues such as damage prevention programs as well as other utility concerns. Technical programs planned for the 1993 conference include trenchless technology, metrication, project coordination, and automated mapping/facilities management/geographical information systems (AM/FM/GIS).

The APWA Research Foundation, in partnership with University of Alabama faculty, was selected by the Federal Highway Administration to develop a highway/utility guide.

This guide will provide an introduction to the better practices being employed to address a full array of issues which can arise from highway and utility facilities sharing common rights-of-way. This manual will be directed toward practitioners and will prove a useful reference for utility and highway

professionals, educators, and government managers.

Copies of the highway/utility guide will be available, ordering information is found at the end of this Appendix.

Utility Location and Coordination Council (ULCC)

The ULCC was established in 1974 by the APWA's Board of Directors to provide guidance and assistance and to promote communication, cooperation, and coordination in an effort to:

- improve and foster safe working conditions,

- reduce the number and severity of accidents,

- minimize construction inconvenience to the public, and

- reduce costs related to utility construction and maintenance activities through cooperation among all parties involved in utility activities including contractors, regulatory and utility officials, and the general public.

An overview of significant ULCC achievements, current projects, and upcoming events includes:

- Strong cooperative programs - The ULCC sponsors the annual Cooperative Members Advisory Panel meeting. This forum fosters communication and cooperative efforts among more than 35 national organizations and federal agencies involved in infrastructure and utility issues.

- Developed and conducts utility location and coordination workshops - to foster communication, cooperation, and coordination around the country.

- Automated mapping/facilities management/geographic information systems - The ULCC assisted in the development of the APWA's workshop on managing the infrastructure and is presently working with other national associations to examine standardized map symbols covering utility and highway features.

- The ULCC Metric Task Force - is developing a metric guide for public works construction. This publication will offer guidance on the transition to the metric system of units.

- Established uniform color code for temporary marking of underground facilities - revised the plastic card which displays this code and its instructions to include the addition of pink for temporary survey markings (with metric units).

- ULCC members - are actively tracking and commenting on proposed legislation related to damage prevention at federal and state levels.

One-Call Systems International

To promote the one-call concept, several one-call centers combined resources in late 1975 as a committee of the ULCC of the APWA. Advances made in the one-call arena under the guidance of this committee are quite significant, they include examples shown below.

- Among the major functions is convening the annual symposium which provides assistance for individuals interested in establishing centers and provides a forum for keeping everyone abreast of state-of-the-art techniques within the industry. The 18th symposium (1992) had more than 600 participants.

- An annual publication called the "Excavator's Damage Prevention Guide and One Call Systems International Directory." It provides a listing of every one-call center in the U.S. along with a summary of state damage prevention laws. The guide is intended as a resource to aid in the prevention of damage to underground facilities.

- Among the many issues addressed are:

- increasing the accuracy of underground utility locates,

- standard message transmission format,

- 24-hour coverage at one-call centers,

- disaster recovery programs, and

- development of a one-call speakers bureau.

The National Common Carrier Cable Hazard Prevention Committee (NCCCHPC)

Formed in May 1990, the NCCCHPC is a steering committee of common carriers. It is unified in addressing issues such as physical protection of cable routes (public and private) through preventing damage to plant which results in service interruptions and adds to increased repair costs.

The NCCCHPC has focused on issues relating to coordination of problems with railroad right-of-way, areas where carriers have facilities which are collocated, and the failure of contractors to use one-call services prior to digging at excavation sites.

The committee successfully completed projects such as:

• The development of a process for notification of fellow carriers about possible dangers to buried facilities.

• The development of specifications for joint signage on collocated facilities, making facilities more readily identifiable to contractors and achieving cost efficiencies within each carrier.

o Hosted and provided extensive damage prevention awareness programs to the contracting industry.

Many areas of concern and issues are being actively pursued by the NCCCHPC at this time, they include:

• Working with the one-call industry to resolve local issues, e.g., 7/24 availability.

• Integration of railroad milepost marker information into the one-call system.

• Identification of areas where route surveillance could be enhanced through joint participation.

• Machine readable locate tickets.

International Right Of Way Association (IRWA)

The IRWA serves approximately 9,500 members of the right of way profession. The association headquarters are located in Gardena, California and organized into 10 regions comprised of 74 chapters throughout North America.

The IRWA mission is to unite the efforts of its members toward individual development, improved service to employers and the public, and improvements to the body of knowledge related to the professional tasks of its members. To achieve these goals, the association provides a code of ethics and rules of professional conduct, a forum for the exchange and advancement of emerging concepts and ideas, conducts education courses and seminars, and offers a program of professional development.

The IRWA has 14 standing international committees. Committees such as the Liaison, Utilities and Pipeline Committee have a long history of being actively involved in damage prevention as well as other issues affecting the use of private and public rights-of-way.

Yearly, the IRWA sponsors the International Education Seminar usually with an attendance of approximately 1,000 participants. The 39th annual seminar held in Calgary, June 20 - 24, 1993 has sessions covering such matters as the highway/utility guide, cathodic protection, roadside safety and several additional topics as well.

The IRWA publishes a magazine six times annually and welcomes unsolicited manuscripts on issues and concerns of industry and right-of-way professionals.

The IRWA Liaison Committee is currently working with the American Association of State Highway Transportation Officials (AASHTO) on an update to their "A Guide for Accommodating Utilities Within Highway Right-of-Way" document.

The committee also maintains close contact with the following federal agencies:

- United States Army Corps of Engineers
- United States Forest Service
- Bureau of Land Management

Federal Highway Administration interaction with these agencies provides input to new legislation and updates to the utility industry.

Document Ordering Information

ANSI/EIA/TIA-590-1991 - Standard for Physical Location and Protection of Below-Ground Fiber Optic Cable Plant

Abstract: This standard specifies cable burial depth and separation and covers preventive measures to reduce damage probability resulting from work operations in the vicinity of fiber cables. It also recommends preventive responsibilities and procedures for excavators and facility owners.

Copies of this standard may be obtained at the current price of $29.00 (each) from:

Global Engineering Documents
2805 McGraw Avenue, Irvine, CA 92714
(714) 261-1455, (800) 854-7179

Global Engineering Documents
7773 Carondelet Ave., Clayton, MO 63105
(314) 726-0444, (800) 854-7179

Global Engineering Documents
1990 M Street, N.W., Suite 400
Washington, D.C. 20036
(202) 429-2860, (800) 544-7179

1993 National Electric Safety Code (NESC)

Abstract: This standard covers hazards safeguards during the installation, operation, or maintenance of 1) electric supply stations, and 2) construction, maintenance, and operation of electric supply and communications lines and equipment.

To purchase the 1993 NESC, write or call:

The IEEE - Standards Group
445 Hoes Lane, Piscataway, NJ 08855-1331
(800) 678-IEEE

The 1993 Code lists for $39.50 per copy, or $27.50 for IEEE members, request item number SH15172.

The 1993 Code and the NESC Handbook may be purchased for $80.00 per set, or $70.00 for members, request item number SH15339.

Highway/Utility Guide

Abstract: The guide introduces better practices to address issues concerning common sharing of highway and utility facilities rights-of-way. A compilation of current good practices for safe utility use in highway corridors is presented.

The guide will be available as a federal publication after July 1993 and as a training course available from the National Highway Institute by the first quarter of 1994. To obtain a copy of the guide after publication contact:

Mr. Paul Scott
Federal Aid Program Branch (HNG-12)
Federal Highway Administration
400 7th Street, S.W., Room. 3132,
Washington, D.C. 20590
(202) 366-4104

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APPENDIX 4

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Network Reliability Council
Issue Statement

Issue Title: Service Disruptions Caused by Physical Damage to Fiber Cables AT&T - NSD
Author: Frank Ianna

Problem Statement/Issues to be Addressed

Fiber optic technology is revolutionizing communications. Not only is the use of such technology proliferating, but also recent advances in fiber optic technology have resulted in increasing concentrations of data being funneled through fewer and fewer facilities. With this level of concentration, relatively minor accidents can potentially have significant consequences.

The fiber optic cable that is part of a fiber optic system is vulnerable to minor accidents and potential physical damage since it is generally located in an uncontrolled environment. Thus, it is important to address how these physical risks to fiber optic cables can be eliminated, mitigated or at least minimized.

Areas of Concern & Problem Quantification

Physical damage to fiber optic cables accounts for a significant percentage of the outages experience by telephone companies. While precise figures are not available, a study conducted by the Federal Aviation Administration (FAA) showed that of the 112 telecommunications outages included in the report by the FAA from August 1990 to August 1991, 51 (46%) were the result of physical damage to fiber optic cables. Since the FAA is geographically dispersed, the 46% failure ratio may be a good estimate of the magnitude of the problem.

Fiber optic cable is used extensively throughout the telecommunications industry. The greatest potential today for significant consequences is for fiber optic cable used on high capacity routes to interconnect central offices and to interconnect remote hubs used in local loops to central officers. However, excavators generally can't distinguish between local loop and interoffice facilities. Because of the high concentration of traffic in these fiber cables, this study should initially focus on these facilities.

The specific areas of concern include the following:

- What are the specific causes of physical damage? (e.g., dig-ups, lightning, floods, technician errors, others).

- How effective are the installation techniques for minimizing risk? (e.g., what is the effectiveness of various placement techniques; aerial, buried, conduit, others).

- How effective is the use of colored marker tape and what can be done with older, existing buried and conduit routes?

- What role, if any, does a geographic region play in the type and frequency of physical damage?

- Can "one-call" centers be made more effective in minimizing risk?

- What administrative processes/procedures are employed to minimize risk? (e.g., patrolling routes, public education imposition of penalties for dig-ups and cuts, other) How effective are these measures? Is federal legislation needed?

- What traffic restoration strategies are employed in the event of a failure? How effective are these strategies?

Description of Proposed Work

The team working this issue should consider the following total quality process to quantify fiber cable vulnerability, identify major reliability issues, and propose problem solutions.

1. Collect appropriate data from all available industry sources to determine and/or confirm areas of greatest criticality and risk, and with the greatest potential for fiber cable reliability improvement. The initial task would be to collect data on each of

the areas of concern identified previously. A threshold issue to be addressed is the study period to be examined. As a start, it is recommended that this study period be from 1989 through the present based on availability of data.

2. Perform sufficient analysis of the data to determine the root cause(s) of the problem(s). Analysis should include prioritizing causes/vulnerabilities based on frequency and geographic areas. In addition, it would be necessary to identify the current industry practices used to prevent those causes deemed to be of the highest priority. Sub-analysis should also include:

o Design shortcomings

o Alarms

o Alarm responses

o Training

o Documentation

o Testing

o Customer training (pubic service agencies, users, other)

3. From the root cause analysis determine an appropriate action plan to reduce/eliminate the possibility or severity of failures in high risk areas. Also consider ways that recovery procedures may be implemented more quickly or efficiently.

4. Determine industry "Best Practices" for dealing with the root cause analysis findings and share this information with industry participants as soon as possible (including the best industry procedures and strategies to prevent and deal with the service effects of physical damage to fiber optic cable). Also consider cost/benefit tradeoffs of these "Best Practices."

5. Develop a time line and metrics to measure the effectiveness of the team's recommendations.

6. Consider the following tactics/ideas offered by the Steering Team as potential means to address the findings of the root cause analysis. These represent ideas from the Steering Team which we want to share. They may be accepted or rejected by the fiber cable focus team:

A. The team should identify the current industry procedures and strategies that are employed in the event of physical damage to a fiber optic cable.

B. The team should determine if the procedures are being followed rigorously and if so investigate and/or develop new/innovative procedures to not only prevent, but also to mitigate the service effects of physical damage to fiber optic cables (e.g., fiber rings).

C. If procedures are not in place in all areas or are not being rigorously applied, the team should develop an implementation plan and/or measurement to obtain improvement.

D. The team should specifically consider strengthening "One Call International" by considering the following actions:

i. Place notification and education information in Phone Directories concerning One-Call information. Place requirements for notification under EXCAVATING in directories.

ii. Work toward the establishment of one statewide, toll free, telephone number for excavators to notify One-Call Centers of planned excavations.

iii. Establish a National Standard for Underground Facility Safety and Damage Prevention. This would set standards for all underground utilities and be adopted by state governments as opposed to the 42 separate state laws that now govern damage prevention. Federal, state, and local agencies would be required to use the notification system.

iv. Strive toward single dispatch to locate all utilities simultaneously in an effort to both reduce

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cost and improve service protection.

v. Establish Express Locate Service for contractors who can't wait for the normal interval for locates. This service would locate utilities the same day and the contractor would pay the cost for this expedited service.

Confidential Information

Arrangements must be established to protect confidential and proprietary information and to assure that any such information is included in reports only on an aggregate masked basis.

Existing Work Efforts

The Electronics Industry Association (EIA) has developed a new ANSI standard, ANSI/TIA-590-1991, which specifies the depth that fiber optic cables must be buried and the separation required from other underground facilities. It also recommends the use of underground warning tape and above ground permanent visible markers. The ANSI/TIA Committee is now collecting comments and evaluating same on TIA-590-1992. In addition, Bellcore has developed a Fiber Optic Cable System Field Failure Database to analyze such failures. This database should prove to be valuable in this effort. In addition, numerous papers and books have been published on survivable architectures and fiber rings. Also, some companies conduct fiber cut drills to evaluate the effectiveness of their procedures.

The EIA in draft standard EIA/TIA-455-181 is nearing completion of a standard that covers the tests needed to establish immunity to lightning of an optical cable. The CCITT in Recommendations K.25 has established techniques for testing immunity to lightning and for protective measures. Committee T1 has started work on a project, "Enhanced Protection of Telecommunication Links from Physical Stress and Radiation Effects," that addresses the survivability of telecommunication links to different levels of physical stress and radiation effects.

Team Leader

Dan Crawford - MCI

Recommended Team Participants

Frank Ianna (Pete Shelus) - AT&T - NSD
Representative from AT&T - NS
Representative from NARUC
Representative from Southwestern Bell
Paul Hart - USTA
Representative from "One-Call" Association
Representative from BellSouth
Representative from "Contractors" Association
Chuck Johnston - Pacific Bell
Representative from Wiltel
Sid Shelton/Frank Zupa - Bellcore

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APPENDIX 5

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Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Network Reliability Performance Objectives	ANSI	T1A1.2/92-001R1	92	Network Survivability Performance Study Project	Survivability as a function of architecture
	ANSI	T1A1.2/93-015	2/93	Draft Proposed Technical Report on Network Survivability Performance, Project T1Q1/90-004R2	
	IEEE	Trans on Reliability	Vol 40, 10/91	Using Distributed Topology Update and Preplanned Configurations to Achieve Trunk Network Survivability	

Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Network Architecture and Design	Bellcore	TR-NWT-000418	12,12/92	Generic Reliability Assurance Requirements for Fiber Optic Transport Systems	
	Comm T1	T1.101	87	Digital Networks	Synchronisation Interface Standards for Digital Networks
	Comm T1	T1.102	87	Digital Hierarchy	Electrical Interfaces
	Comm T1	T1.104	91	Exchange-Interexchange Carrier Interfaces	Individual Channel Signaling Protocols
	Comm T1	T1.105	91	Digital Hierarchy	Optical Interface Rates and Formats Specifications
	Comm T1	T1.105a	91	See Above	See Above
	Comm T1	T1.106	88	Digital Hierarchy	Optical Interface Specifications: Single-Mode
	Comm T1	T1.107	88	Digital Hierarchy	Formats Specifications
	Comm T1	T1.107a	90	See Above	See Above
	Comm T1	T1.107b	91	Digital Hierarchy	Formats Specifications Supplement
	Comm T1	T1.110	92	Signaling System7	General Information
	Comm T1	T1.117	91	Digital Hierarchy	Optical Interface Specifications (Short Reach)

Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Network Architecture and Design	ANSI	T1A1.2/93-015	2/93	Draft Proposed Technical Report on Network Survivability Performance, Project T1Q1/90-004R2	Survivability as a function of architecture
	CCITT	Blue Book	Vol. IX	Series K Recommendations - Protection Against Interference	
	CCITT	Blue Book	Vol. IX	Series L Recommendations - Construction, Installation and Protection of Cable and Other Elements of Outside Plant	
	CCITT	Study Group II			Survivable architectures
	CCITT	Study Group XVIII			Survivable architectures
	AT&T		85	Telecommunications Electrical Protection	
	Underwriters Lab	UL 1459		Standard for Telephone Equipment	
	IEEE	Journal of Selected Areas	Vol 7, 10/89	Computer-Aided Design Procedures for Survivable Fiber Optic Networks	
	IEEE	Commu Magazine	11/90	Feasibility Study of a High-Speed SONET Self-Healing Ring Architecture in Future Interoffice Networks	

Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Network Architecture and Design	IEEE	Trans on Reliability	Vol 40, 10/91	Design of Survivable Communications Networks under Performance Constraints	
	IEEE	Global Tele Conference	12/90	A Class of Self-Healing Ring Architecture for SONET Network Applications	
		Telephony	10/90	Getting to the source of network disasters	
	Bellcore	Exchange	March/April 88	New light on network design	

Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Network Interconnection and Interoperability	Comm T1	T1.101	87	Digital Networks	Synchronisation Interface Standards for Digital Networks
	Comm T1	T1.102	87	Digital Hierarchy	Electrical Interfaces
	Comm T1	T1.104	91	Exchange -Interexchange Carrier Interfaces	Individual Channel Signaling Protocols
	Comm T1	T1.105	91	Digital Hierarchy	Optical Interface Rates and Formats Specifications
	Comm T1	T1.105a	91	See Above	See Above
	Comm T1	T1.106	88	Digital Hierarchy	Optical Interface Specifications: Single Mode
	Comm T1	T1.107	88	Digital Hierarchy	Formats Specifications
	Comm T1	T1.107a	90	See Above	See Above
	Comm T1	T1.107b	91	See Above	See Above
	Comm T1	T1.111	92	Signaling System 7	Message Transfer Part
	Comm T1	T1.112	92	Signaling System 7	Signaling Connection Control Part
	Comm T1	T1.113	92	Signaling System 7	ISDN User Part
	Comm T1	T1.114	92	Signaling System 7	Transaction Capability Application Part
	Comm T1	T1.117	91	Digital Hierarchy	Optical Interface Specifications (Short Reach)
	Comm T1	T1.118	92	Signaling System 7	Intermediate Signaling Network Identification

Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Network Management	Comm T1	T1.115	90	Signaling System 7	Monitoring and measurements for SS7 Networks
	IEEE	Trans on Reliability	Vol 40, 10/91	Using Distributed Topology Update and Preplanned Configurations to Achieve Trunk Network Survivability	

Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Restoration and Recovery	IEEE	Trans on Reliability	V... 10, 10/91	Using Distributed Topology Update and Preplanned Configurations to Achieve Trunk Network Survivability	
	Comm T1	T1.115	90	Signaling System 7	Monitoring and measurements for SS7 Networks
	ANSI	T1A1.2/92-001R1		Network Survivability Performance Study Project	Survivability as a function of architecture
	CCITT	Study Group IV			Restoration studies

Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Operations, Administration, Maintenance	Comm T1	T1.104	91	Exchange -Interexchange Carrier Interfaces	Individual Channel Signaling Protocols
	Comm T1	T1.105	91	Digital Hierarchy	Optical Interface Rates and Formats Specifications
	Comm T1	T1.116	90	Signaling System 7	Operations, Maintenance and Administrative Part
	ANSI	T1A1.2/92-001R1		Network Survivability Performance Study Project	Survivability as a function of architecture
	ANSI	T1M1			SONET studies

Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Human Factors Design	ANSI	T1E1.7 & 8			Develops electrical and physical protection standards for exchange and interexchange carrier networks

Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Survivability Analysis Models and Tools	IEEE	Journal on Selected Areas	V ' SAC-4, ., 88	Approximate Markov Modeling of High-Reliability Telecommunications Systems	
	IEEE	Journal of Lightwave Tech	Vol 6, 11/88	Survivable Network Architectures for Broad-Band Fiber Optic Networks: Model and Performance Comparison	
	IEEE	Trans. on Commu	pp. 69-72, 89	Modeling and Analysis of Systems with Multimode Components and Dependent Failures	
	IEEE	Trans. on Commu	pp. 495-503, 90	A path-based approach for analysing reliability of networks with dependent failures and multimode components	
	IEEE	Computer	pp. 49-57, 4/91	Reliability Modeling: An Overview for System Designers	
	IEEE	INFOCOM '92	Paper 7B.1	Token Ring Reliability Models	Models the reliability of IEEE 802.5 token LAN rings

Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Survivability Analysis Models and Tools	Globecom	92 Proceedings	12/92	Survivability Risk Analysis and Cost Comparison of SONET Architectures	
	Globecom	92 Proceedings	12/92	Risk Analysis for Improving CCS#7 Survivability	
	RAM	Annual 1991 Proceedings	pp. 129-136, 91	Reliability and Availability Modeling of Coupled Communications Networks	

Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Network Security					

Network Reliability Industry Initiatives

Focus Area: Fiber Cable

Topic	Industry Group	Doc. No. Issue No. Standards No.	Version No. and Date	Title	Brief Description
Regulations	Congress	H.R. 4789	4/92	Telephone Network Reliability Improvement Act of 1992	This bill would have required the FCC to establish and enforce network reliability standards (failed to pass in 92)
	Congress	S.237	1/93	National Network Security Board Act of 1993	Bill to create NS board to investigate and make recommendations regarding network security and reliability
	Congress	S.238	1/93	Telecommunications Network Security and Reporting Act of 1993	Bill to require FCC to report to Congress network security and reliability matters

APPENDIX 6

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Call-Before-You-Dig - Statute Analysis by State

State	Statute/Law	Effectiveness* (1-3 Ranking)	Comments
AK	No	1	
AL	No	1	Note A
AR	Yes	2	
AZ	Yes	2	
CA	Yes	2	
CO	Yes	2	Note A
CT	Yes	2	
DE	Yes	2	
DC	Yes	2	
FL	Yes	3	
GA	Yes	3	
HI	No	1	
IA	Yes	3	Note B
ID	Yes	2	
IL	Yes	2	
IN	Yes	2	
KS	Yes	3	Note B
KY	No	1	
LA	Yes	2	
MA	Yes	2	
MD	Yes	3	
ME	Yes	2	
MI	Yes	3	
MN	Yes	2	
MO	Yes	2	
MS	Yes	1	
MT	Yes	2	

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Call-Before-You-Dig - Statute Analysis by State
(continued)

State	Statute/Law	Effectiveness* (1-3 Ranking)	Comments
NC	Yes	2	
ND	Yes	3	
NE	No	1	
NH	Yes	2	
NJ	Yes	2	
NM	Yes	3	
NV	Yes	2	
NY	Yes	3	
OH	Yes	2	
OK	Yes	2	
OR	Yes	1	
PA	Yes	2	
RI	Yes	1	
SC	Yes	2	
SD	Yes	2	
TN	Yes	1	Note A
TX	No	1	
UT	Yes	2	
VA	Yes	3	
VT	Yes	2	
WA	Yes	2	
WI	Yes	2	
WV	No	1	Note C
WY	Yes	2	

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Effectiveness Ranking Compared to Model Legislation

1 = Inadequate
2 = Marginal
3 = Effective

Comments:

A = New legislation is pending
B = Law recently enacted
C = Legislation defeated in 1992

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APPENDIX 7

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A bill to be entitled

An act relating to underground facilities, creating the Underground Facility Damage Prevention and Safety Act; providing legislative intent; providing definitions; providing for participation by underground facility operators; providing procedures; requiring notice of excavations and demolitions; providing for liability of certain entities and the system providing civil and criminal penalties; providing an exemption for single family residential owner; providing an exception for emergency excavations under certain circumstances; providing for applicability and construction; providing severability; providing an effective date.

Be It Enacted by the Legislature of State(s) (TBD)

Section 1. Short title; legislative intent.--

(1) This act may be cited as the "Underground Facility Damage Prevention and Safety Act."

(2) It is the purpose of this act to: aid the public by preventing injury to persons or property and the interruption of services resulting from damage to an underground facility caused by excavation or demolition operations.

Section 2. Definitions.-- As used in this act:

(1) "Business hours" means all hours of a day.

(2) "Damage" means any impact upon or contact with, including, without limitation, penetrating, striking, scraping, displacing, or denting, however slight, the protective coating, housing, or other protective devices of any underground facility, or the removal or weakening of any lateral or vertical support from any underground facility, or the severance, partial or complete, of any underground facility.

(3) "Demolish" or "demolition" means any operation by which a structure or mass of material is wrecked, razed, rended, moved, or removed by means of any tool, equipment, or discharge of explosives, or any disturbances of the earth in any manner on public or private lands which could damage any underground facility.

(4) "Excavate" or "excavation" means any manmade cut, cavity, trench, or depression in the earth's surface, formed by removal of earth, intended to change the grade or level of land, or to penetrate or disturb the surface of the earth, but does not include tilling of soil for agricultural purposes.

(5) "Excavator" or "excavating contractor" means any person performing excavation or demolition operations.

(6) "Operator" means any person who furnishes or transports materials or services by means of an underground facility.

(7) "Person" means any individual, firm, joint venture, partnership, corporation, association, municipality or other political subdivision, governmental unit, department, or agency, and includes any trustee, receiver, assignee, or personal representative of a person.

(8) "Underground facility" means any public or private personal property which is buried, placed below ground, or submerged on any operator's right-of-way, easement, or permitted use which is being used or will be used in connection with the storage or conveyance of water, sewage, electronic, telephonic, or telegraphic communications, electric energy, oil, petroleum products, natural gas, optical signals, or other substances, and includes, but is not limited to, pipes, sewers, conduits, cables, valves, and lines. For purposes of this act, a liquified petroleum gas line is not an underground facility unless such line is subject to the requirements of Title 49, Code of Federal Regulations, provided there is no encroachment on any operator's right-of-way, easement, or permitted used.

(9) "System" means a telephone notification system as provided in this act.

Section 3a. Procedures.--

(1)(a) Not less than 2 nor more than 5 business days before beginning any excavation or demolition, an excavator shall provide the following information to each operator:

1. The name of the individual who provided notification and the name, address, including the street address, city, state, zip code, and telephone number of his employer.

2. The name and telephone of the representative for the excavator.

3. The county, the city or closest city and the street address of the closest street, road, or intersection to the location where the excavation or demolition is to be performed, and the construction limits of the excavation or demolition.

4. The commencement date and anticipated duration of the excavation or demolition.

5. Whether machinery will be used for the excavation or demolition.

6. The person or entity for whom the work is to be done.

7. The type of work to be done.

8. The approximate depth of the excavation.

(1)(b) The excavator shall provide such information by calling the operator's toll-free number.

1. Each notification shall be recorded to document compliance with the act. Such record may be made by means of electronic, mechanical, or any other method of all incoming and outgoing wire and oral communications concerning location requests. Such records shall be kept for a period of 5 years and, upon written request, shall be available to the excavator making the request.

2. If an operator determines that a proposed excavation or demolition is in proximity to or in conflict with an underground facility of the operator, the operator shall identify the horizontal route to within 24 inches form the outer edge of either side of the underground facility by the use of stakes, paint, flags, or other suitable means within 48 hours. After the time the notification is received, if the operator is unable to respond within such time, the operator shall communicate with the person making the request and negotiate a new schedule and time that is agreeable to, and should not unreasonably delay, the excavator.

3a. An excavator shall avoid excavation it the area described in the notice given pursuant to subsection (1) until each operator underground facility has been marked and located, or for 48 hours, after notification, whichever occurs first. If an operator has not located and marked its underground facilities within 48 hours, after notification under the system the excavator may proceed with the excavation, provided the excavator does so with reasonable care, and provided, further, that detection equipment or other acceptable means to locate underground facilities are used.

3b. An excavator shall not excavate or demolish in the area described in the notice given pursuant to subsection (1) until all operator underground facilities have been marked and located, or removed.

4. An operator which certifies that it does not have accurate information concerning the exact location of its underground facilities is exempt from the requirements of subsection 3, but shall provide the best available information to the excavator in order to comply with the requirements of this section. An excavator is not liable for any damage to an underground facility under the exemption in this subsection if the excavation or demolition is performed with reasonable care and detection equipment or other acceptable means to locate underground facilities is used.

5. If extraordinary circumstances exist, an operator shall notify the excavator of the operator's

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inability to comply with this section. For the proposes of this section, "extraordinary circumstances" means circumstances other than normal operating conditions which exist and make it impractical for an operator to comply with the provisions of the act. The operator is relieved of responsibility for compliance under the law during the periods that the extraordinary circumstances exist and shall properly notify the excavator when the extraordinary circumstances cease to exist.

(6) If an operator determines that the excavation or demolition is not near an existing underground facility of the operator, the operator shall notify the excavator within 48 hours, excluding days other than business days, from the time of the notification that no conflict exists and that the excavation or demolition area is clear. An excavator is responsible for contacting the operator if a facility is not marked.

(7) An operator shall use the recommended guidelines for uniform temporary marking of underground facilities as approved by the Utility Location and Coordinating Council of the American Public Works Association when marking the horizontal route of any underground facility of the operator.

(8) Prior to or during excavation or demolition, if the marking of the horizontal route of any facility is removed or is no longer visible, the excavator shall stop excavation or demolition activities in the vicinity of the facility and shall notify the operator(s) to have the route remarked.

(9) If any contact with or damage to any pipe, cable, or its protective covering, or any other underground facility occurs, the excavator causing the contact or damage shall immediately notify the operator. Upon receiving notice, the operator shall send personnel to the location as soon as possible to effect temporary or permanent repair of the contact or damage. Until such time as the contact or damage has been repaired, the excavator shall cease excavation or demolition activities that may cause further damage to such underground facility.

Section 4. Liability of the operator and excavator.

(1)(a) Any person who violates subsection (1) or subsection (4) of section 3a and subsequently, whether by himself or through his employees, contractors, subcontractors, or agents, performs excavation or demolition work which damages an underground facility of an operator shall be strictly liable to such operator for:

1. Any cost incurred by the operator in repairing or replacing a damaged facility.

2. Any damage to property or any injury or death to a person resulting from damaging the underground facility of the operator.

3. Any loss of revenue or loss of use resulting from such damage to an underground facility.

Any such person shall also indemnify the operator against any claim for personal injury, death, property damage, or service interruptions resulting from damage to the underground facility.

(b) If any excavator fails to discharge a duty imposed by the provisions of this act, excluding subsections (1) and (4) of section 3, such person shall be liable for the total sum of the losses to all parties involved as those cost are normally computed.

(c) Obtaining information as to the location of an underground facility from the operator as required by this act does not excuse any excavator from performing an excavation or demolition in a careful and prudent manner, based on accepted engineering and construction practices, nor does it excuse such excavator from liability for any damage or injury resulting from any excavation or demolition.

(d) When an excavator knows or should know of the presence of an underground facility, he shall make reasonable efforts to contact the person who owns or operates that facility prior to commencing an excavation or demolition, regardless of whether

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that person in an operator.

(3) If, after receiving proper notice an operator fails to discharge a duty imposed by the provisions of this act and an underground facility of such operator is damaged by an excavator who has complied with the provisions of this act, as a proximate result of the operator's failure to discharge such duty, such excavator shall not be liable for such damage.

Section 5. Penalties.--

(1) Any excavator who knowingly and willfully violates any provision of this act may be assessed a civil penalty of not more than $1,000 for the first violation and not more than $5,000 for any subsequent violation during a 12-month period. Such penalties are in addition to any other civil penalties that may be imposed.

(2) Any person who knowingly and willfully removes or otherwise destroys the stakes or other physical markings used to mark the horizontal route of an underground facility commits a misdemeanor.

(3) An action may be brought by the Attorney General, the State attorney, or the local or state agency which issued the permit to excavate for the enforcement of the civil penalty pursuant to this section. If any penalty is collected as a result of a civil suit brought by a state or local agency for the collection of such civil penalties, the penalty imposed shall be paid to the general fund of the agency. If more than one agency is involved in enforcement, the penalties imposed shall be apportioned among them by the court in a manner that will fairly offset the relative costs incurred by the state or local agencies, or both, in collection such penalties.

Section 6. Single-family residential property exemption.--The notification requirements provided in subsection (1) of section 5 do not apply to any excavation or demolition performed by the owner of single-family residential property when such excavation or demolition is made entirely on such land, provided there is no encroachment on any operator's right-of-way, easement, or permitted use

Section 7. Emergency excavations or demolitions attempted; exception.--The provisions of this act do not apply to making an excavation or demolition during an emergency, provided the operator was notified at the earliest opportunity and all reasonable precautions had been taken to protect any underground facility. For the purposes of this act, "emergency" means an condition constituting a clear and present danger to life or property caused by the escape of any material or substance transported by means of an underground facility; any interruption of vital public service or communication caused by any break or defect in an operator's underground facility; or, in the case of the State Highway System or streets or roads maintained by a political subdivision, if the use of such highways, roads, streets, or other public ways is, in the judgement of duly authorized officials of the Department f Highway Safety and Motor Vehicles and the Department of Transportation or such political subdivision, impaired by an unforeseen occurrence which necessitates repair beginning immediately after such occurrence. The time requirements for notification provided in this act do not apply to emergency excavations.

Section 8. Applicability to existing law.--Nothing in this act shall be construed to:

(1) Constitute the establishment or enlargement of any rights to the use of real property or create an interest therein for the placement, construction, repair, maintenance, relocation, or excavation or demolition of any underground facility.

(2) Waive any right of a party having an interest in real property to charge any fee for the use regarding such property; or

(3) Preempt a governmental operator from reasonable regulation of its right-of-way.

Section 9. If any provision of this act or the application thereof to any person or circumstance is

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held invalid, the invalidity shall not affect other provisions or applications of the act which can be given effect without the invalid provision or application, and to this end the provisions of this act are declared severable.

Section 10. This act shall take effect upon becoming a law.

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Glossary of Terms

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ABBREVIATIONS/ACRONYMS

AASHTO	American Association of State Highway Transportation Officials
ANSI	American National Standards Institute
APWA	American Public Works Association
CAEG	Computer Aided Engineering and Graphics Program
CCS	(digital) Cross Connect Systems
CDP	Cable Damage Prevention
CEO	Chief Executive Officer
EDPG	Excavator's Damage Prevention Guide
ECSA	Exchange Carriers Standard Association
EIA	Electronics Industry Association
EMC	Electromagnetic Compatibility
EMP	Electromagnetic Pulse
FCC	Federal Communications Commission
GIS	Geographic Information System
IEEE	Institute of Electrical and Electronic Engineers
IRWA	International Right of Way Association
ITM	Installation, Testing, and Maintenance Committee
IXC	Interexchange Carrier
LEC	Local Exchange Carrier
NCCCHPC	National Common Carrier Cable Hazard Prevention Committee
NCS	National Communications System
NEC	National Engineering Consortium
NOF	Network Operations Forum
NOREST	Network Reliability Council Steering Team
NSEP	National Security, Emergency Preparedness
NUCA	National Utility Contractors Association
NRC	Network Reliability Council
NSEP	National Security, Emergency Preparedness
NSTAC	National Security Telecommunications Advisory Committee
OCSI	One-Call Systems International Committee
OSHA	Occupational Safety and Health Administration
PVC	polyvinyl chloride
RSPA	Research and Special Programs Administration (DOT's One-Call research)
SNSC	Signaling Network Systems Committee
SHAs	State Highway Agencies
SPOCs	Single Points of Contact
telco	telephone company
TIA	Telecommunications Industry Association
TRG	Threshold Reporting Group
TIBC	Telecommunications Industry Benchmarking Consortium
USTA	Unites States Telephone Association
ULCC	Utility Location and Coordinating Council

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